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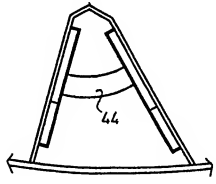
(54) Title: A MASSAGE PLANT FOR MEAT

(57) Abstract

A massage plant for the processing of chunks of meat comprises a container (22) which is rotatable about its longitudinal axis and provided interiorly with axially or substantially axially extending conveyors (16). The conveyors are made as a hollow profile where channels are provided on their insides which are preferably produced by securing a sheet by means of embossments (e.g. temp-plates or vortex plates), in such a manner that a space is generated between the sheet and the hollow profile which has a connection (42, 46) for a fluid for regulating the temperature of the containers' load of meat and brine. The fact that the conveyors extend axially makes the entire container interior easy to survey which is important e.g. for cleaning purposes. The construction of the conveyors is furthermore comparatively simple and in the event of a leakage, the valuable meat contained in the container is not contaminated by the fluid, since the spilled matter runs within the hollow profile where it is possible to detect any spillage.



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A massage plant for meat

The present invention relates to a massage plant for the processing of chunks of meat and of the type that comprises a rotatable container provided with conveyors with flow paths for a fluid for adjusting the temperature of the container contents.

Massaging plants for the processing of meat chunks by massaging brine into the meat is well known, cf. e.g. WO 89/08982 and GB-A 2 085 742 and EP-B 0 127 608.

During the mechanical massaging process, a fairly substantial amount of heat is generated, and the ambient temperature also heats up the meat. In order to counteract such heating, the containers are typically provided with a cooling jacket. On the outside of the cooling jacket, however, an ice layer is formed which is undesirable from a sanitary point of view. To avoid such ice layer formation the container is in some cases provided with an external insulation. In addition to increasing the cost of and complicating the construction, the insulation is also undesired for veterinary reasons. Another way of keeping the meat chilled is by means of vacuum and evaporation of an inert gas in the container. It goes without saying that it is not always desirable to use a gas in direct contact with the meat. Moreover the operation of the plant is not without difficulty, and the construction in itself makes comparatively severe requirements. To avoid these problems, it has even been attempted to encapsulate the entire plant in an insulated cabinet, which obviously not only is cost-raising but also complicates the operation procedure, since access to the plant is restricted by a door in the cabinet.

However, one plant with conveyors in the form of two oppositely oriented spiralling vanes is known, cf. GB-A 2 085 742, wherein the further development described US-A 4 994 29

performs a chilling operation by circulating a coolant through a labyrinth in the spiralling vanes.

However, there are several aspects to the case, such as cleaning and inspection of the container, which are difficult in case of a container with spiralling vanes since inaccessible surfaces exist behind the turns.

In order for the container to obtain the desired degree of loading, the size of the container opening is usually very small which complicates the cleaning and inspection. In some cases the containers are even arranged in an inclined position to obtain adequate loading, cf. US-A 4 994 294, whereby the frontmost portion of the container remains fairly inoperative during the massaging process since the meat will collect at the bottom of the container.

The invention provides a massage plant wherein the container is provided with axially extending or substantially axially extending conveyors, the cavities of which contain one or more separate channels on or adjacent to their inner surfaces for the conveyance of the temperature-adjusting fluid. This provides a simple and also very effective construction. Any leakage of fluid will occur inside the conveyor cavity where it may be detected, and not into the container's load of meat and brine which would otherwise be ruined. Moreover, all interior surfaces of the container are readily visible when inspection is to be carried out of the cleaning which is in itself more easily performed when the conveyors extend axially.

The channels may be conduits or sheet elements attached directly to the conveyors, or they may be in the form of an insert. According to a particularly preferred solution, the temp-plate elements known per se are used or vortex sheets (in the following jointly designated temp-plate elements).

Temp-plate elements are used for performing a wide variety of tasks within the heating/cooling technology for a wide variety of applications, e.g. for the slaughtering and brewing industries, for the dairy sector and for the chemo-technical industry. The temp-plate elements consist of two sheet components with spaces between close positioned point joinings. In one type spot weldings are performed whereupon pressure is applied to the temp-plate element causing bulgings to occur between the spot weldings. According to another design, the sheets are pre-embossed with locking of circular openings and they are welded at their periphery. According to one embodiment of the invention, the side of the massaging vane constitutes the one sheet component of the temp-plate element whereby as close a thermal contact with the the container interior as possible is established. Stainless steel, commonly used for the containers, does not possess particularly good thermal conductivity which is why good contact with the massaging vanes is necessary.

According to a particularly simple embodiment the massaging vane has two planar lateral surfaces between which the medium is conveyed forwards at the one side and returned at the other. At the rear of the container, a distribution manifold for the conveyors is provided which means that the interior of the container is free except for the conveyors.

In a method of operating a massage plant according to the invention, coolant as well as heating medium may be conveyed to the massaging vane thereby imparting to the load the optimum starting temperature for the process.

One embodiment of the invention will now be explained in further detail with reference to the accompanying drawings, wherein:

Fig. 1is a direct, lateral view of the massager,
Fig. 2is a direct, front view of the massager,

Fig. 3 is a longitudinal sectional view of the container,

Figs 4,5 are sectional views through the conveyors wherein the view of Figure 5 is taken at the conical tapering section,

Figs 6,7 are sectional views of two different embodiments of temp-plate elements, and

Fig. 8 is a direct end view of the container.

As will appear from Figures 1 and 2 of the drawings, the massage plant comprises a container 2 which is secured to be rotatable about its longitudinal axis and tiltable in a rack 4 over an intermediate frame 6.

By means of a hydraulic cylinder 8 at each side, the intermediate frame with the container may be tilted over an axis 10. The container opening 12 which may be hermetically closed by means of a cover 14 has been enlarged whereby the loading and unloading operations are facilitated, and so is the cleaning. As will appear, the container may occupy three positions, viz. a backwardly tilted filling position which enables a high degree of filling despite the large container opening 12, a not shown horizontal position in which the container rotates and exercises the massaging process, and a forwardly tilted discharge position indicated by the dotted line in Figure 1.

For tumbling the meat, the container interior is provided with conveyors 16 which extend parallel with the rotational axis of the container as will appear from the longitudinal sectional view of the container shown in Figure 3. The conveyors 16 extend in the entire container length from the bottom 18 at the rear to the conical tapering section 20 at the front. Apart from this, the container interior is completely smooth and all surfaces are readily visible through the enlarged container opening which also serves to alleviate the cleaning operation.

The massaging vanes are constructed in accordance with the sectional views in Figures 4 and 5, i.e. they are made of bent sheet components whose edges are fully welded onto the inside of the container jacket 22. As will appear, the conveyors have two planar lateral surfaces 24, to the insides of which a so-called temp-plate 26 element is secured to form a channel for the conveyance of a coolant or heating medium for regulating the temperature conditions in the container interior. The temp-plate elements extend across the entire or substantially the entire length of the conveyors. In Figures 6 and 7 of the drawing, two examples of temp-plate elements are given, the first exemplifying a sheet 28 spotwelded in points 30 to produce a uniform pattern on the inside of the conveyor, and fully welded along the edges. Subsequently a hydraulic pressure is applied between the sheets whereby the temp-plate element is caused to expand between the spot weldings to produce channels for the fluid between the spot weldings. In the alternative embodiment shown in Figure 7, a pre-embossed sheet 32 with openings 34 is used. The sheet is welded onto the massaging vane in the rims of the opening - in both instances a coherent channel 36 is thus produced between the weldings. A comparatively large flow area is thus provided which makes it easier to adjust the temperature since a comparatively large amount of fluid may be conveyed therethrough.

The fluid flow is additionally designed to have a supply flow at the one side of the conveyors and a return flow at the opposite side. In the container 18, two conduits 38,40 are provided which constitute the supply flow and the return flow, respectively, cf. Figure 8. Through the end wall within the conveyor cross section, the supply flow 38 with connections 42 are connected to the one temp-plate element. At the front, the temp-plate element is connected to the temp-plate element at the opposite side of the conveyor by means of a connection 44 whereupon the fluid returns through the temp-plate element and transfers to the return flow 38 via a

connection 46 in a manner corresponding to that of the supply flow.

The production of the massaging vanes is comparatively simple since the welding of the the temp-plate elements is carried out in the planar state of the component whereupon the profile of the massaging vane is generated by bending. It is a further advantage that the temp-plate elements may be pressure tested prior to welding of the massaging vanes in the container whereby it is ensured that no leaks occur in the finished construction.

As will appear, the construction is comparatively simple while retaining its efficiency, and a comparatively exact adjustment of the temperature may also be carried out. Typically, a chilling operation is performed, but if the temperature of the meat is too low for the desired process, heating may be effected by conveyance of a heating agent through the temp-plate elements.

Of course, the invention is not limited to using temp-plates; sheet elements with other kinds of point embossments, corrugated sheets or planar sheets of other labyrinth configurations may be used.

Thus, the invention provides an effective and simple construction, wherein an effective chilling may be carried out and wherein the option of heating is also available. Moreover, the container is readily cleaned and easy to inspect.

Claims

1. A massage plant for the processing of chunks of meat and of the type comprising a container (2) which is rotatable about its longitudinal axis and provided at its interior with conveyors (16) with flow paths for a fluid for adjusting the temperature of the container's load of meat and brine, characterized in that the container (2) is provided with axially extending or substantially axially extending conveyors (16), the cavities of which contain one or more channels on or adjacent to their inner surfaces for the conveyance of the temperature adjusting fluid.

2. A massage plant according to claim 1, characterized in that the fluid channels are constituted of temp-plate elements.

3. A massage plant according to claim 2, characterized in that the conveyors (16) constitute one side wall of the temp-plate elements (26).

4. A massage plant according to claim 3, characterized in that the conveyors (16) have two planar surfaces (24) onto which the temp-plate component (28,32) is secured.

5. A massage plant according to claims 1, 2, 3 or 4, characterized in that it is provided in such a manner that the fluid is conveyed forwards at the one side (42) of the conveyors (16) and returned at the other (46).

6. A massage plant according to claim 5, characterized in that a distribution manifold (38,40) for the fluid with connection to the fluid channels extends through the container bottom within the profile of the conveyors (16).

7. A massage plant according to claim 6, c h a r a c t e r i z e d in that the manifold comprises two concentric conduits (38,40) wherein one constitutes a supply conduit (38) and the other a return conduit (40).

8. A massage plant according to any one of the preceding claims, c h a r a c t e r i z e d in that it comprises a cooling source for coolant and a heating source for heating medium and a valve arrangement for switching between the two media.

9. A method of operating a massager according to claims 1-8, c h a r a c t e r i z e d in that a coolant is conveyed through the channels in the conveyors for chilling the load to the desired temperature, alternatively that a heating medium is conveyed through the channels of the conveyors for heating the load until the desired temperature has been reached.

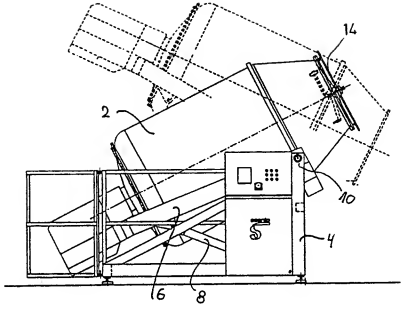


Fig. 1

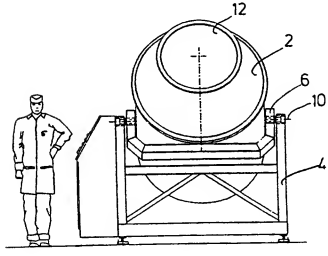


Fig. 2

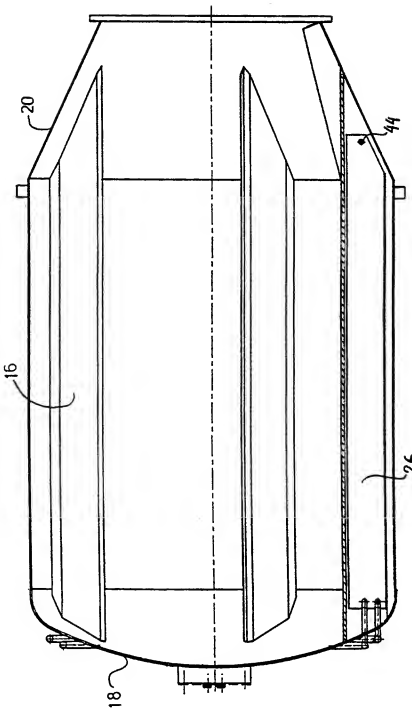


Fig. 3

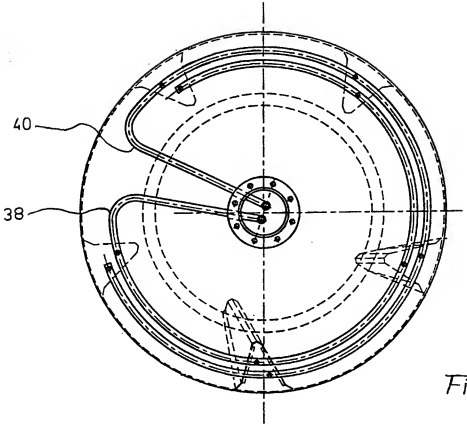


Fig. 8

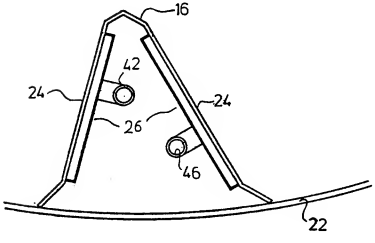
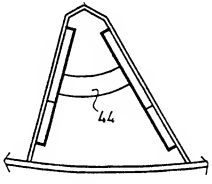


Fig. 4

Fig. 5



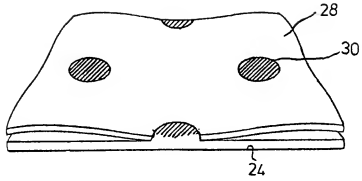


Fig. 6

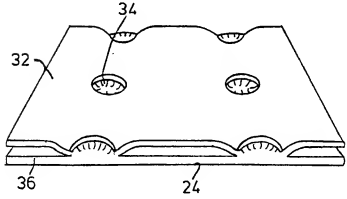


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 96/00221

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A22C 9/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A22C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4994294 A (B. GOULD), 19 February 1991 (19.02.91), column 6, line 41 - line 44	5,8,9
Y	EP 0643918 A1 (STORK PROTECON-LANGEN B.V.), 22 March 1995 (22.03.95)	1,5-9
Y	DK 157595 B (SCANIO FOOD EQUIPMENT A/S), 3 April 1982 (03.04.82)	1,5-9
A	WO 9508922 A1 (ULBRICHT, CHRISTIAN), 6 April 1995 (06.04.95)	

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Information on patent family members

31/07/96

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